Baton Rouge Community College
Academic Affairs Master Syllabus

Date Approved or Revised: July 22, 2008

Course Name: Calculus I
Course Number: MATH 210

Lecture Hrs. 5   **Lab Hrs. 0**   **Credit Hrs. 5**

Course Description: This is the first course of a three-course sequence. The concept of a limit is introduced, and it is used to develop the concepts of continuity and the derivative. These are studied numerically, graphically, and analytically for a wide variety of elementary, and transcendental functions. Applications of the derivative relating to curve sketching, related rates, and optimization are developed. Definite and indefinite integrals, the Fundamental Theorem of Calculus, and applications of the integral are also introduced.

Prerequisites: MATH 101 or MATH 110 and MATH 111 or MATH 120
Co-requisites: None

Calculator Highly Recommended: TI83 or TI84 or Scientific

Learning Outcomes: Upon successful completion of this course, the student will be able to:

- Find the limits of a variety of algebraic and transcendental functions both analytically and graphically;
- Determine the continuity of a function at a point, and classify a discontinuity as either removable or non-removable;
- Find the derivative of a variety of algebraic and transcendental functions using the limit definition of the derivative;
- Apply the basic rules of differentiation (Power, Sum/Difference, Product, Quotient, and Chain) to find the derivative of a variety of algebraic and transcendental functions;
- Apply the derivative to find the equation of the tangent line to a curve at a given point;
- Apply the derivative to solve problems of related rates;
- Apply the derivative to solve problems of optimization;
- Apply the derivative as an aid to curve sketching;
- Find the antiderivative of a variety of algebraic and transcendental functions;
- Find the area under the curve of a non-negative continuous function bounded on a closed interval using Reimann Sums; and
- Apply the Fundamental Theorem of Calculus to evaluate a definite integral.

General Education Learning Outcomes: This course supports the development of competency in the following areas. Students will:

- Think critically, collect evidence (statistics, examples, testimony) and make decisions based on the evidence, comprehend and analyze texts, and solve problems using methods of critical and scientific inquiry; and
- Organize, analyze, and develop useful information useful by employing mathematical principles.

Assessment Measures:

- A comprehensive final exam; and
- Instructor created exams and or homework

Information to be included on the Instructors' Course Syllabi:

- *Disability Statement***:** Baton Rouge Community College seeks to meet the needs of its students in many ways. See the Office of Disability Services to receive suggestions for disability statements that should be included in each syllabus.

- *Grading:* The College grading policy should be included in the course syllabus. Any special practices should also go here. This should include the instructor's and/or the department's policy for make-up work. For example in a speech course, "Speeches not given on due date will receive no grade higher than a sixty" or "Make-up work will not be accepted after the last day of class."

- *Attendance Policy***:** Include the overall attendance policy of the college. Instructors may want to add additional information in individual syllabi to meet the needs of their courses.

- *General Policies***:** Instructors' policy on the use of things such as beepers and cell phones and/or hand held programmable calculators should be covered in this section.

- *Cheating and Plagiarism***:** This must be included in all syllabi and should include the penalties for incidents in a given class. Students should have a clear idea of what constitutes cheating in a given course.

- *Safety Concerns:* In some programs this may be a major issue. For example, "No student will be allowed in the safety lab without safety glasses." General statements such as, "Items that may be harmful to one's self or others should not be brought to class."

- *Library/ Learning Resources:* Since the development of the total person is part of our mission, assignments in the library and/or the Learning Resources Center should be included to assist students in enhancing skills and in using resources. Students should be encouraged to use the library for reading enjoyment as part of lifelong learning.

Expanded Course Outline:

I.   Limits and Their Properties
             A. A Preview of Calculus
             B. Finding Limits Graphically and Numerically
             C. Continuity and One-Sided Limits
             D. Infinite Limits

II.   Differentiation
             A. The Derivative and the Tangent Line Problem
             B. Basic Differentiation Rules and Rates of Change
             C. The Product and Quotient Rules and Higher-Order Derivatives
             D. The Chain Rule
             E. Implicit Differentiation
             F. Derivatives of Inverse Functions
             G. Related Rates
             H. Newton's Method

III.   Applications of Differentiation
             A. Extrema on an Interval
             B. Rolle's Theorem and the Mean Value Theorem
             C. Increasing and Decreasing Functions and the First Derivative Test
             D. Concavity and the Second Derivative Test
             E. Limits at Infinity
             F. A Summary of Curve Sketching
             H. Optimization Problems

IV.   Integration
             A. Antiderivatives and Indefinite Integration
             B. Area
             C. Reimann Sums and Definite Integrals
             D. The Fundamental Theorem of Calculus
             E. Integration by Substitution
             F. Numerical Integration
             G. The Natural Logarithmic Function: Integration
             H. Inverse Trigonometric Functions: Integration
             I. Hyperbolic Functions.